

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
24 July 2003 (24.07.2003)

PCT

(10) International Publication Number
WO 03/061146 A1

(51) International Patent Classification⁷: **H04B 1/38**,
5/02 // 1/59

(21) International Application Number: PCT/SE02/02025

(22) International Filing Date:
6 November 2002 (06.11.2002)

(25) Filing Language: Swedish

(26) Publication Language: English

(30) Priority Data:
0103762-1 13 November 2001 (13.11.2001) SE

(71) Applicant (for all designated States except US): **TAG-MASTER AB** [SE/SE]; Electrum 410, S-164 40 Kista (SE).

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

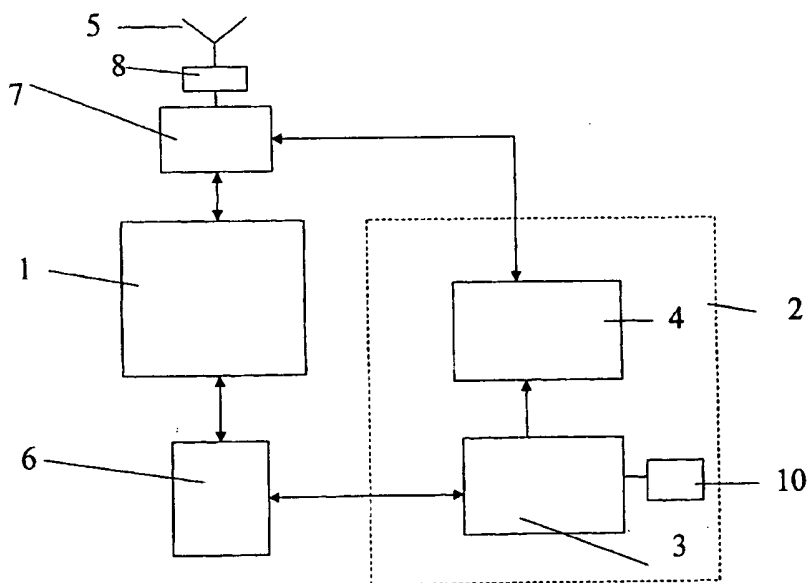
— with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(72) Inventor; and
(75) Inventor/Applicant (for US only): **WILLGERT, Mikael** [SE/SE]; Skiljevägen 23, S-163 54 Spånga (SE).

(74) Agents: **ÖRTENBLAD, Bertil** et al.; Noréns Patentbyrå AB, Box 10198, S-100 55 Stockholm (SE).

(54) Title: A COMMUNICATIONS UNIT



(57) **Abstract:** The present invention relates to a communications unit for identifying objects or persons, comprising a receiver/transmitter unit (1) according to a so called Bluetooth system and a transponder (2) according to a so called RFID system. The invention is characterised in that the transponder (2) is integrated with the receiver/transmitter unit (1) in a manner such as to enable components associated with the receiver/transmitter unit to be used also for transponder operation.

WO 03/061146 A1

A COMMUNICATIONS UNIT

The present invention relates to a communications unit.

5 Known automatic identification systems that use radio frequencies, so-called RFID (Radio Frequency Identification) include identification tags (ID tags) and communicators. Each identification tag includes an antenna, a modulator, and a control logic circuit for controlling the modulator. One such ID tag is designed to receive a signal sent by a communicator and to reflect this signal in a modulated state.

10

The ID tag is affixed to the object or to the person that shall be identified. The identity can be read by a communicator at a given short distance, for example of five metres. Depending on design, it is also possible in addition to reading an identity to read and write other information from and into the ID tag respectively, with the aid of the communicator.

15

The relatively short range of, e.g., five metres, makes it possible to communicate with the ID tags within a geographically limited communications area.

For the same reason identification that is based solely on so-called Bluetooth technology is less suitable, since the communications area is large. A typical occurrence is that the power received by the communicator in an RFID system decreases with the distance $R = 1/R^4$, whereas the corresponding power in a Bluetooth system decreases with the distance $R = 1/R^2$.

20 However, an ID system is highly usable *per se*, as is also a Bluetooth system *per se*. Consequently, it is often necessary for a user to have access to both systems for different applications. Naturally, this results in higher costs than when only one of the systems is used. Moreover, it is, of course, troublesome for a user to carry two systems on his/her person.

30

The present invention solves this problem and provides a solution to this problem that significantly lowers the costs and affords simpler handling.

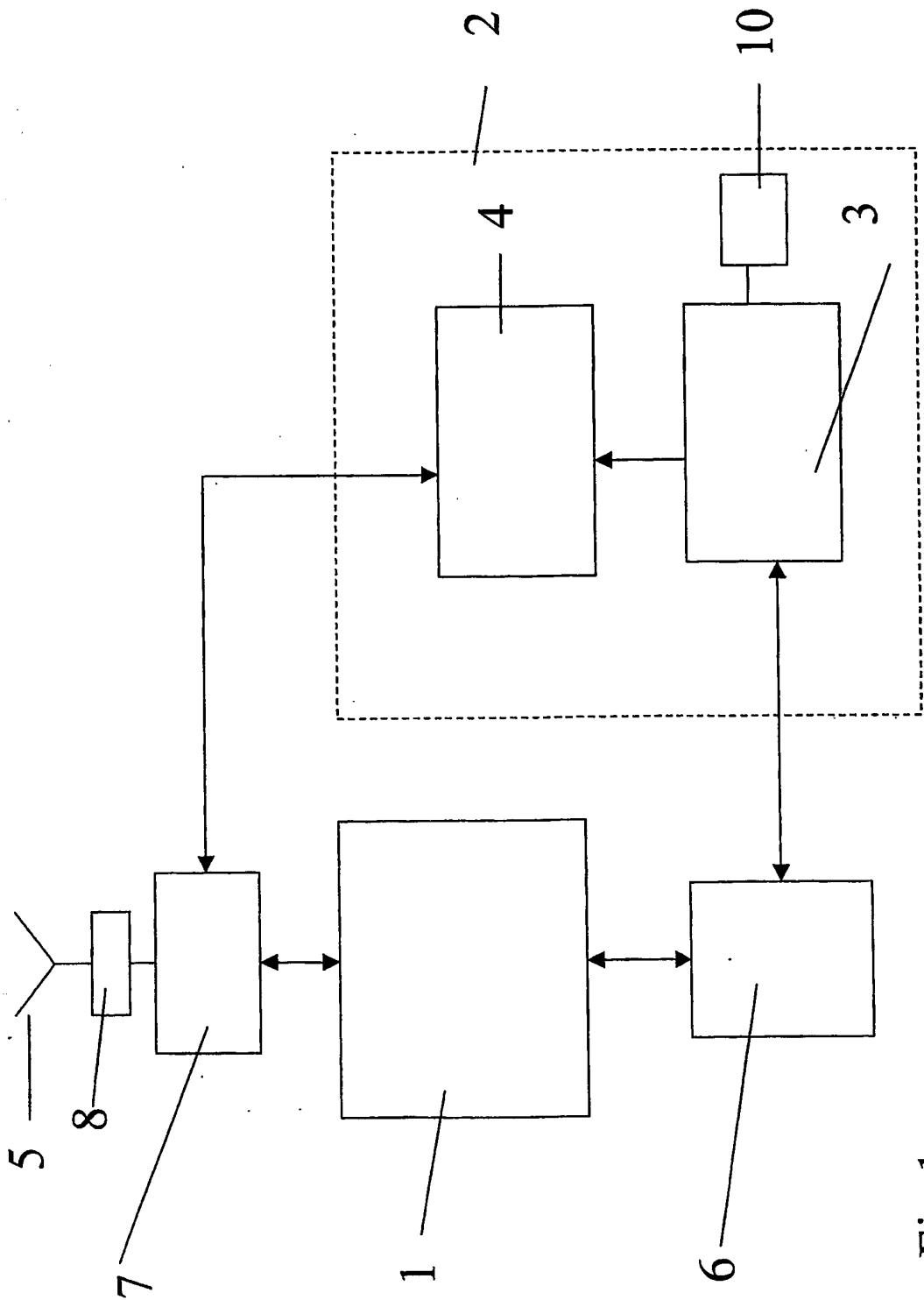


Fig.1

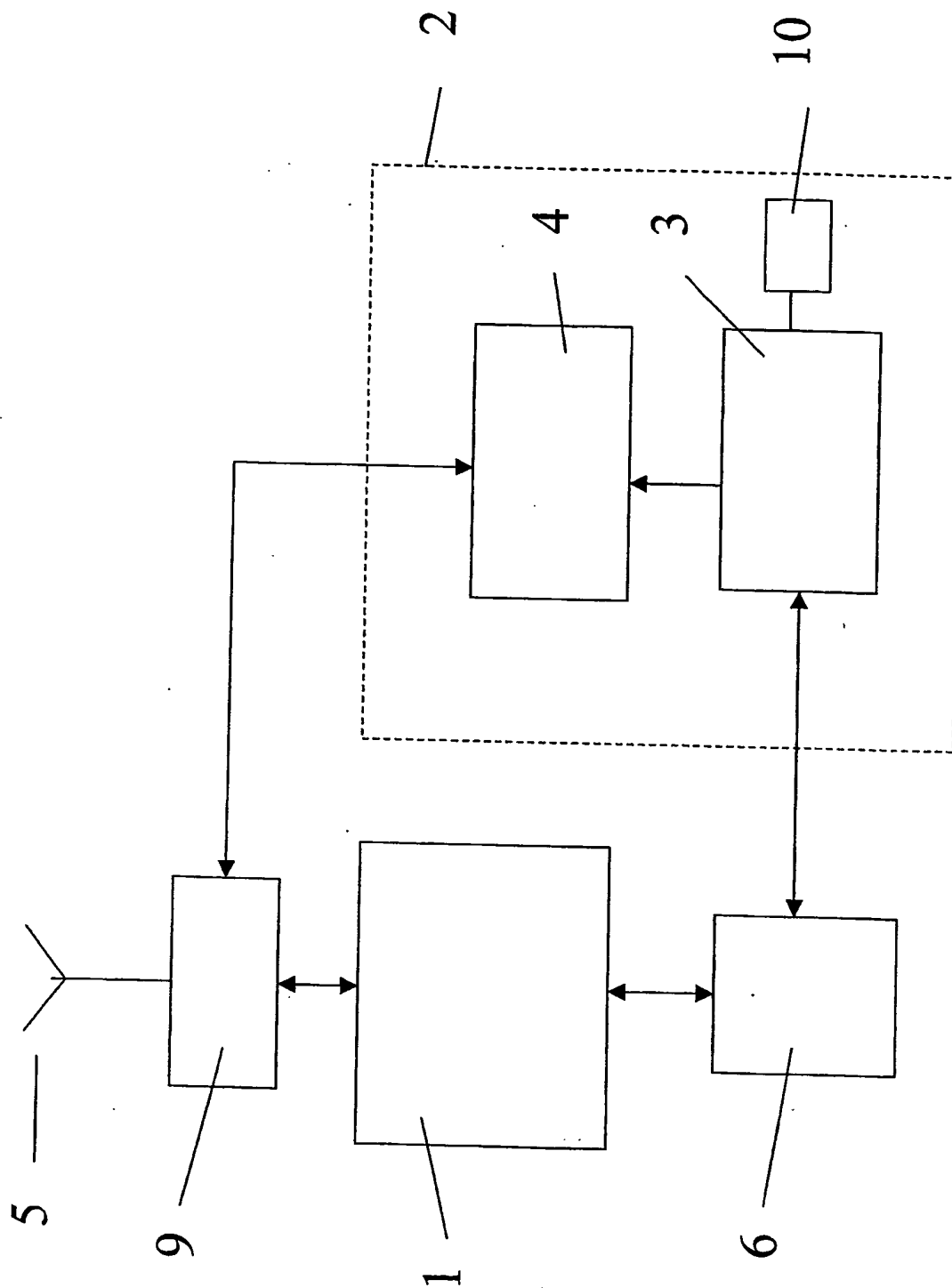


FIG.2

The present invention thus relates to an object or person identification communications unit that includes a receiver/transmitter unit according to a so-called Bluetooth system and a transponder according to a so-called RFID system, and is characterised in that the transponder is integrated with the receiver/transmitter unit such as to enable components associated with said receiver/transmitter unit to be used also for transponder operation.

The invention will now be described in more detail partly with reference to an exemplifying embodiment thereof shown in the accompanying drawings, in which

- Figure 1 illustrates a first embodiment of the invention; and
- Figure 2 illustrates a second embodiment of the invention.

Shown in Figures 1 and 2 is a communications unit for identifying objects or persons. The unit includes a receiver/transmitter unit 1 in accordance with a Bluetooth system. The communications unit also includes a transponder 2 in accordance with a so called RFID system. The figures also show transponder specific circuits within the dotted frame.

According to the invention, the transponder 2 is integrated with the receiver/transmitter unit 1 in a manner such as to enable components associated with the receiver/transmitter unit to be used also for operation of the transponder 2, i.e. when the transponder receives a query signal and when it reflects and modulates said signal.

Thus, the invention relates to a communications system for communication with both an RFID system and a Bluetooth system.

The transponder 2 is of a kind known *per se*. It includes control logic 3 and an associated memory and modulator 4. The transponder is thus adapted to receive a query signal sent from a suitably known communicator and therewith reflect the received signal while modulating the signal with a pulse train. Information relating to the pulse train is stored in the memory. The pulse train is received and decoded by the communicator. The modulated signal may contain various types of information. Each transponder will typically have a unique identity that is sent to the communicator in the aforesaid manner.

However, the transponder may also be designed to enable information to be written into the transponder memory, wherewith said information can be read-out from the memory

later on, in the aforesaid manner. In this regard, the write signal is a modulated signal sent by the communicator. In the case of this embodiment, the control logic 3 includes a decoder, which functions to decode the signal received.

- 5 According to a highly preferred embodiment, the transponder 2 includes only one modulator 4, whereas the transponder is arranged in other respects to use, in operation, the antenna 5 of the receiver/transmitter unit 1, control circuit 6 and a battery (not shown) belonging to the Bluetooth arrangement 1. In the case of this embodiment, the function of the control logic 3 is thus included in the function of the control circuit 6.

10

According to a first embodiment of the invention, shown in Figure 1, an electronic switch 7 is included between the common antenna 5 and the specific components of the receiver/transmitter unit 1 and the specific components of the transponder 2 respectively.

- 15 The switch 7 is controlled by a detector 8 positioned at the antenna 5 and functions to detect whether a signal received by the antenna 5 is a Bluetooth signal or an RFID signal intended for the transponder 2. Upon completion of this detection, the signal received is sent either to the Bluetooth arrangement 1 or alternatively to the transponder 2.

- 20 The switch 7 is controlled by the control circuit 6, when transmitting from the communications unit.

When a transponder signal is received, the signal will either be reflected by the modulator 4 or, if it is a write signal, will be decoded in the aforesaid manner and entered into the memory, depending on the design of the transponder.

25

When the signal received is a Bluetooth signal, a transmitter signal is created in the receiver/transmitter unit 1 and sent to the antenna 5.

- 30 According to a second embodiment of the invention, illustrated in Figure 2, a power divider 9 is located between the common antenna 5 and the specific components of the receiver/transmitter unit 1 and the specific components of the transponder 2 respectively. In this case, the Bluetooth arrangement 1 and the transponder both receive a signal at one

and the same time. Either the Bluetooth arrangement 1 or the transponder 2 will send a signal in response to the signal received, depending on the type of signal.

5 When the transponder is a read-only transponder, i.e. information can only be read from the transponder, it is beneficial in respect of both embodiments that the transponder 2 is provided with its own battery 10 for supplying power to the control logic 3 of the transponder.

10 Different embodiments with different degrees of integration between the Bluetooth arrangement and the transponder have been mentioned above.

According to one embodiment which is highly preferred in respect of certain applications, the sole transponder specific component is the transponder 2 modulator 4 which is adapted to modulate and reflect a received signal in the absence of a fresh supply of energy to the
15 received signal. When the aforesaid power divider 9 is used, this embodiment enables the transponder 2 to function without the Bluetooth arrangement 1 being in operation.

It will be apparent that the present invention solves the problems mentioned in the introduction.
20

In one highly user-friendly application, a transponder can also be included in a mobile telephone designed for Bluetooth communication.

25 This design is particularly advantageous when the present communications unit is constructed so that the transponder will also function when the mobile telephone is switched-off in general. This means that the user can be identified without carrying a separate transponder.

30 A design in which Bluetooth and transponder are both integrated in a mobile telephone enables, e.g., the transponder to be used for identifying a user of a computer or some other equipment equipped with Bluetooth for making use of Bluetooth communication possible.

Although the invention has been described above with reference to a number of exemplifying embodiments, it will be obvious that the invention can be varied with respect to its constructive design.

- 5 The present invention shall not therefore be considered to be limited to said exemplifying embodiments, since these embodiments can be modified within the scope of the accompanying Claims.

CLAIMS

1. A communications unit for identifying objects or persons, comprising a receiver/transmitter unit (1) according to a so called Bluetooth system and a transponder (2) according to a so called RFID system, **characterised** in that the transponder (2) is integrated with the receiver/transmitter unit (1) in a manner such as to enable components associated with the receiver/transmitter unit to be used also for transponder operation.
2. A communications unit according to Claim 1, **characterised** in that the transponder (2) includes a modulator (4) whereas the transponder (2) is arranged to use the antenna (5), control system (6) and battery of the receiver/transmitter unit (1) in operation.
3. A communications unit according to Claim 1 or 2, **characterised** in that the transponder (2) is equipped with an own battery (10) for supplying current to the control logic (3) of the transponder.
4. A communications unit according to Claim 1, 2, or 3, **characterised** by a power divider (9) positioned between the common antenna (5) and the specific components of the receiver/transmitter unit (1) and the specific components of the transponder (2) respectively.
5. A communications unit according to Claim 1, 2, 3 or 4, **characterised** by an electronic switch (7) positioned between the common antenna (5) and the specific components of the receiver/transmitter unit (1) and the specific components of the transponder (2) respectively.
6. A communications unit according to Claim 5, **characterised** in that said switch (7) is controlled by a detector (8) when transmitting from the communications unit, wherein the detector is adapted to ascertain whether the signal received by the antenna (5) is a Bluetooth signal or a signal intended for the transponder (2).
7. A communications unit according to any one of the preceding Claims, **characterised** in that the sole specific component of the transponder is a transponder (2) modulator (4)

which is adapted to modulate and reflect a received signal in the absence of the supply of fresh energy to the received signal.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 02/02025

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: H04B 1/38 // H04B 5/02, H04B 1/59

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: H04B, G01S

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-INTERNAL, WPI DATA, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 1126400 A2 (YOZAN INC.), 22 August 2001 (22.08.01), column 2, line 10 - column 4, line 21, figure 1 --	1-7
Y	WO 0145319 A1 (TELEFONAKTIEBOLAGET LM ERICSSON (PUBL)), 21 June 2001 (21.06.01), figure 2, page 5, paragraph [3]; page 8, paragraph [2-3] --	1-7
Y	WO 0139103 A1 (TAGMASTER AB), 31 May 2001 (31.05.01), page 5, line 20 - line 31, figure 2 -- -----	1-7

☐ Further documents are listed in the continuation of Box C.
 ☒ See patent family annex.

* Special categories of cited documents:

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier application or patent but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

12 February 2003

Name and mailing address of the ISA/
Swedish Patent Office
Box 5055, S-102 42 STOCKHOLM
Facsimile No. +46 8 666 02 86

Date of mailing of the international search report

13 -02- 2003

Authorized officer

Johanna Schyberg/mj
Telephone No. +46 8 782 25 00

INTERNATIONAL SEARCH REPORT

30/12/02

International application No.

PCT/SE 02/02025

Patent document cited in search report				Publication date		Patent family member(s)		Publication date	
EP	1126400	A2	22/08/01	AU	1310001	A	27/08/01		
				CN	1309473	A	22/08/01		
				JP	3306658	B	24/07/02		
				JP	2001230699	A	24/08/01		
				WO	0161876	A	23/08/01		

WO	0145319	A1	21/06/01	AU	2417501	A	25/06/01		
				SE	9904683	A	18/06/01		
				US	2001007815	A	12/07/01		

WO	0139103	A1	31/05/01	AU	1910701	A	04/06/01		
				EP	1247244	A	09/10/02		
				SE	515289	C	09/07/01		
				SE	9904314	A	30/05/01		
